

## WHAT IS CLAIMED IS

1. A semiconductor device comprising:  
an insulating film comprising silicon oxide on an insulating surface,  
wherein the insulating film includes halogen at a concentration of  $5 \times 10^{20} \text{ cm}^{-3}$  or less  
and carbon at a concentration of  $5 \times 10^{19} \text{ cm}^{-3}$  or less which are detected by second ion mass  
spectroscopy.
2. A device according to claim 1, wherein the halogen is chlorine.
3. A device according to claim 1, wherein the halogen is fluorine.
4. A device according to claim 1,  
wherein the insulating film includes carbon at a concentration of  $1 \times 10^{18} \text{ cm}^{-3}$  or less  
which is detected by the second ion mass spectroscopy.
5. A device according to claim 1,  
wherein the insulating film includes halogen at a concentration of  $1 \times 10^{17} \text{ cm}^{-3}$  or  
more which is detected by the second ion mass spectroscopy.
6. A device according to claim 1,  
wherein the insulating film is a gate insulating film.
7. A device according to claim 1,  
wherein the insulating film is an insulating film in a thin film transistor.
8. A device according to claim 1,  
wherein the insulating film covers an even surface over a glass substrate.
9. A device according to claim 1,  
wherein the insulating film is formed by plasma chemical vapor deposition using an  
organic silane.
10. A device according to claim 9,  
wherein the organic silane comprises at least a material selected from the group  
consisting of  $\text{Si}(\text{OC}_2\text{H}_5)_4$ ,  $\text{Si}_2\text{O}(\text{OC}_2\text{H}_5)_6$ ,  $\text{Si}_3\text{O}_2(\text{OC}_2\text{H}_5)_8$ ,  $\text{Si}_4\text{O}_3(\text{OC}_2\text{H}_5)_{10}$  and  $\text{Si}_5\text{O}_4(\text{OC}_2\text{H}_5)_{12}$ .

11. A semiconductor device comprising:  
a crystalline semiconductor island on an insulating surface; and  
an insulating film including silicon oxide to cover the crystalline semiconductor island,  
wherein the insulating film includes halogen at a concentration of  $5 \times 10^{20} \text{ cm}^{-3}$  or less and carbon at a concentration of  $5 \times 10^{19} \text{ cm}^{-3}$  or less.
12. A device according to claim 11,  
wherein the concentrations of halogen and carbon are detected by secondary ion mass spectroscopy.
13. A device according to claim 11, wherein the halogen is chlorine.
14. A device according to claim 11, wherein the halogen is fluorine.
15. A device according to claim 11,  
wherein the insulating film includes carbon at a concentration of  $1 \times 10^{18} \text{ cm}^{-3}$  or less.
16. A device according to claim 11,  
wherein the insulating film includes halogen at a concentration of  $1 \times 10^{17} \text{ cm}^{-3}$  or more.
17. A device according to claim 11,  
wherein the insulating film is formed by plasma chemical vapor deposition using an organic silane.
18. A device according to claim 17,  
wherein the organic silane comprises at least a material selected from the group consisting of  $\text{Si}(\text{OC}_2\text{H}_5)_4$ ,  $\text{Si}_2\text{O}(\text{OC}_2\text{H}_5)_6$ ,  $\text{Si}_3\text{O}_2(\text{OC}_2\text{H}_5)_8$ ,  $\text{Si}_4\text{O}_3(\text{OC}_2\text{H}_5)_{10}$  and  $\text{Si}_5\text{O}_4(\text{OC}_2\text{H}_5)_{12}$ .
19. A semiconductor device including at least a thin film transistor comprising:  
a crystalline semiconductor island on an insulating surface;  
a silicon oxide film over the crystalline semiconductor island; and  
a conductive film including at least one of aluminum, titanium, and titanium nitride, said conductive film being formed on the silicon oxide film,  
wherein the silicon oxide film includes halogen at a concentration of  $5 \times 10^{20} \text{ cm}^{-3}$  or less and carbon at a concentration of  $5 \times 10^{19} \text{ cm}^{-3}$  or less.

20. A device according to claim 19,  
wherein the concentrations of halogen and carbon are detected by secondary ion mass spectroscopy.
21. A device according to claim 19, wherein the halogen is chlorine.
22. A device according to claim 19, wherein the halogen is fluorine.
23. A device according to claim 19,  
wherein the silicon oxide film includes carbon at a concentration of  $1 \times 10^{18} \text{ cm}^{-3}$  or less.
24. A device according to claim 19,  
wherein the silicon oxide film includes halogen at a concentration of  $1 \times 10^{17} \text{ cm}^{-3}$  or more.
25. A device according to claim 19,  
wherein the silicon oxide film is formed by plasma chemical vapor deposition using an organic silane.
26. A device according to claim 17,  
wherein the organic silane comprises at least a material selected from the group consisting of  $\text{Si}(\text{OC}_2\text{H}_5)_4$ ,  $\text{Si}_2\text{O}(\text{OC}_2\text{H}_5)_6$ ,  $\text{Si}_3\text{O}_2(\text{OC}_2\text{H}_5)_8$ ,  $\text{Si}_4\text{O}_3(\text{OC}_2\text{H}_5)_{10}$  and  $\text{Si}_5\text{O}_4(\text{OC}_2\text{H}_5)_{12}$ .
27. A semiconductor device including at least a thin film transistor comprising:  
a crystalline semiconductor island on an insulating surface;  
a gate insulating film including silicon oxide on the crystalline semiconductor island;  
and  
a gate electrode on the gate insulating film,  
wherein the gate insulating film includes halogen at a concentration of  $5 \times 10^{20} \text{ cm}^{-3}$  or less and carbon at a concentration of  $5 \times 10^{19} \text{ cm}^{-3}$  or less.
28. A device according to claim 27,  
wherein the concentrations of halogen and carbon are detected by secondary ion mass spectroscopy.
29. A device according to claim 27, wherein the halogen is chlorine.
30. A device according to claim 27, wherein the halogen is fluorine.

31. A device according to claim 27,  
wherein the gate insulating film includes carbon at a concentration of  $1 \times 10^{18} \text{ cm}^{-3}$  or less.
32. A device according to claim 27,  
wherein the gate insulating film includes halogen at a concentration of  $1 \times 10^{17} \text{ cm}^{-3}$  or more.
33. A device according to claim 27,  
wherein the gate insulating film is formed by plasma chemical vapor deposition using an organic silane.
34. A device according to claim 33,  
wherein the organic silane comprises at least a material selected from the group consisting of  $\text{Si}(\text{OC}_2\text{H}_5)_4$ ,  $\text{Si}_2\text{O}(\text{OC}_2\text{H}_5)_6$ ,  $\text{Si}_3\text{O}_2(\text{OC}_2\text{H}_5)_8$ ,  $\text{Si}_4\text{O}_3(\text{OC}_2\text{H}_5)_{10}$  and  $\text{Si}_5\text{O}_4(\text{OC}_2\text{H}_5)_{12}$ .